

Evaluation of Fungicides for Control of Dollar Spot on Creeping Bentgrass, 2004

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Objective:

The objective of this research was to evaluate the performance of registered and experimental fungicides and application programs for control of dollar spot on creeping bentgrass maintained at putting green height.

Rationale:

Fungicides are essential tools for managing diseases of fine turf, especially creeping bentgrass. Dollar spot is among the most problematic of the bentgrass diseases because outbreaks result in measurable reduction in aesthetic quality and can significantly impair playing surfaces. Moreover, because infection threatens during the entire growing season, dollar spot control is a concern from May through October. Golf course superintendents rely on timely application of fungicides to suppress dollar spot development and they are continually challenged to do so with products and application programs that will be both effective and economical. This research will help superintendents make more informed disease control decisions by providing objective evaluations of fungicides for dollar spot control.

How it was done:

The research was conducted at the Purdue University W.H. Daniel Turfgrass Research and Diagnostic Center in West Lafayette, IN. The experimental site was a stand of Pennlinks creeping bentgrass located in block 16.5 and maintained at a height of 0.14 in. Fertilization, irrigation and aerification operations were done according to standard practices for creeping bentgrass green. During spring and summer 2004, fertilizer (18-4-10) was applied at a rate of approximately 1.0 lb N per 1000 sq ft on 13 May, 0.5 lb N per 1000 sq ft on 28 June, and 0.5 lb N per 1000 sq ft on 23 August.

Individual treatment plots measured 3.3 ft by 6.6 ft (1m x 2m) and were randomized within each of the 4 replications. Plots were left to natural inoculation. Fungicide applications were made using a custom-built bicycle wheel boom sprayer. Three nozzles (Tee-Jet 8004 EVS, flat fan) were mounted approximately 12 in. apart on a boom located 12 in. from the ground. The sprayer was calibrated to deliver 2 gal per 1000 sq ft at 40 psi. All treatments were initiated on 19 May. Treatments were applied at intervals specified in the tables.

Data were subjected to analysis of variance and mean separation procedures. Results are presented in Tables 1. Turf quality evaluations are presented in Table 2.

Results:

The prevailing weather during the course of the experiment was unusually favorable for dollar spot development. In terms of moisture and temperature, the six week period from mid June through late July was remarkably favorable for dollar spot development.

Most of the products applied at 14- and 21-day intervals provided excellent control of dollar spot through 26 July, approximately 2 weeks after the final spray. (The final spray for the 14-day interval treatments was applied on 14 July. The final spray for the 21-day interval treatments was applied on 21 July.) This is a credit to these fungicides because they were challenged by conditions that included ample background inoculum and disease-favorable environmental conditions. Insight into the residual efficacy of the treatments can be gained by observing disease development from 26 July through 17 August. The Emerald 70WG 0.13 oz treatment, the Eagle 40WSP 0.6 oz, and the three Chipco 36/26 treatments sustained less disease and greater turf quality throughout the experimental period. On some rating dates they were only numerically superior from others, on other dates statistical significance was demonstrated as well.

Table 1 Disease^a severity on creeping bentgrass after applications of fungicide

Treatment and rate/1000 sq ft	Spray Interval (days)	-----%-----							
		28 Jun	6 Jul	13 Jul	19 Jul	26 Jul	2 Aug	9 Aug	17 Aug
No fungicide		6.5a	3.9a	34.6a	50.7a	50.7a	66.7a	56.4a	45.0a
Armada 50WDG 0.6 oz	14	1.6bc	1.1b-d	1.1c	0.8c	0.6c	1.6e	3.9e-g	3.3f
Armada 50WDG 1.2 oz	21	1.6bc	0.6d	1.1c	1.4c	0.6c	3.9e	5.2e-g	5.2ef
Compass 50WDG 0.15 oz	21	2.2b	1.6b	19.5b	39.3b	34.5b	45.0b	56.4a	45.0a
Bayleton 50W 0.75 oz	21	1.6bc	0.8cd	1.3c	1.6c	1.1c	6.6de	9.4d-f	13.5c-e
Insignia 20WG 0.9 oz	14	1.6bc	1.4bc	2.2c	1.6c	1.6c	15.4cd	19.5bc	19.5b-d
Emerald 70WG 0.13 oz	14	1.6bc	1.1b-d	0.6c	0.6c	0.6c	0.6e	0.6g	1.6f
Chipco 36/26 2.6 fl oz	14	0.8c	0.6d	0.6c	0.6c	0.6c	0.6e	1.1fg	1.6f
Chipco 36/26 3.8 fl oz	14	0.8c	0.6d	0.8c	0.6c	0.6c	0.8e	1.4fg	1.6f
Chipco 36/26 5.0 fl oz	14	0.8c	0.6d	0.6c	0.6c	0.6c	0.6e	0.8fg	1.6f
Emerald 70WG 0.18 oz	21	1.6bc	1.1b-d	1.3c	0.6c	0.6c	2.2e	2.8fg	2.8f
Eagle 20EW 0.3 oz	14	1.6bc	1.6b	1.6c	1.6c	1.6c	9.4de	12.0c-e	10.7d-f
Ealge 40 WSP 0.6 oz	14	1.6bc	0.6d	1.1c	1.4c	0.6c	0.8e	1.6fg	1.6f
Signature Program 1**	14	1.6bc	1.6b	2.8c	1.6c	1.1c	7.9de	14.8cd	22.3bc
Signature Program 2	14	1.6bc	1.6b	3.3c	2.2c	1.1c	14.8cd	20.4bc	25.1b
Daconil Ultrex 82.5 WDG 3.2 oz	14	1.6bc	1.1b-d	3.3c	1.6c	1.6c	19.5c	25.1b	25.1b
LBG G31 9.0 fl oz + Aviator 0.5 fl oz	14		1.4bc	1.6c	1.6c	0.8c	3.5e	3.9e-g	6.6ef
Vital sign 6 fl oz + Concorde 82.5 WDG 3.2 oz + Aviator 0.5 fl oz	14		1.1b-d	1.6c	1.6c	0.6c	3.9e	6.6d-g	5.2ef

^a Fungicide performance was evaluated at approximately 7-day intervals. Infection centers (dollar spots) were counted from 28 May through 6 July. From 28 June through 17 August, disease severity was estimated using the Horsfall Barratt rating scale.

^b Treatments followed by the same letter within columns are not statistically different according to Fisher's unprotectd LSD, P=0.05.

^c The Signature Program 1 included the following treatments and application dates.

Chipco Signature (4.0 oz) + Bayleton 50 DF (1.0 oz), May 18
 Chipco Signature (4.0 oz) + Armada (6.0 oz), June 02
 Chipco Signature (4.0 oz) + Chipco 26GT (4.0 fl oz), June 16
 Chipco Signature (4.0 oz) + Armada (6.0 oz), June 30
 Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), July 14

The Signature Program 2 included the following treatments and application dates.

Chipco Signature (4.0 oz) + Bayleton 50 DF (1.0 oz), May 18
 Chipco Signature (4.0 oz) + Compass 50WDG (0.15 oz) + Chipco 26GT (4.0 fl oz), June 02
 Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), June 16
 Chipco Signature (4.0 oz) + Chipco 26GT (4.0 fl oz), June 30
 Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), July 14

Table 2 Turf quality^a of creeping bentgrass after applications of fungicides for dollar spot.

Treatment and rate/1000 sq ft	Spray Interval (days)	-----%-----							
		28 Jun	06 Jul	13 Jul	19 Jul	26 Jul	02 Aug	09 Aug	17 Aug
No fungicide		5.0f ^b	5.0f	5.0e	4.5g	4.5g	4.0g	5.0e	5.0d
Armada 50WDG 0.6 oz	14	7.0cd	7.3bc	7.5ab	7.8ab	7.0d	6.5cd	6.0bc	5.5c
Armada 50WDG 1.2 oz	21	7.5a-c	8.0a	7.8ab	7.3bc	6.0de	5.5e	5.5d	5.0d
Compass 50WDG 0.15 oz	21	5.0f	5.8e	5.0e	4.8g	5.0fg	4.0g	5.0e	5.0d
Bayleton 50W 0.75 oz	21	7.0cd	7.5a-c	7.3bc	6.8cd	5.3f	5.0ef	5.0e	5.0d
Insignia 20WG 0.9 oz	14	7.3bc	7.3bc	5.0e	5.8ef	5.0fg	4.8f	5.0e	5.0d
Emerald 70WG 0.13 oz	14	7.8ab	7.5a-c	8.0a	8.0a	7.8a	7.8a	7.0a	7.0a
Chipco 36/26 2.6 fl oz	14	8.0a	8.0a	7.8ab	8.3a	8.0a	7.3ab	6.3b	6.3b
Chipco 36/26 3.8 fl oz	14	7.5a-c	8.0a	7.8ab	8.0a	8.3a	7.5ab	6.8a	6.3b
Chipco 36/26 5.0 fl oz	14	7.8ab	8.0a	8.0a	8.0a	8.0a	7.5ab	6.8a	6.0b
Emerald 70WG 0.18 oz	21	7.0cd	7.5a-c	7.5ab	8.0a	6.8bc	6.3d	5.8cd	6.0b
Eagle 20EW 0.3 oz	14	6.5de	7.0cd	5.0e	6.3de	5.5ef	5.0ef	5.0e	5.0d
Eagle 40WSP 0.6 oz	14	7.5a-c	7.8ab	7.5ab	7.3bc	7.0b	7.0bc	6.3b	6.3b
Signature Program 1 ^c	14	6.3e	7.0cd	5.3e	6.3de	6.5b-d	5.0ef	5.0e	5.0d
Signature Program 2	14	6.3e	6.5d	5.0e	5.5f	6.3cd	5.0ef	5.0e	5.0d
Daconil Ultrex 82.5WDG 3.2 oz	14	6.3e	7.0cd	5.0e	5.8ef	5.3f	5.0ef	5.0e	5.0d
LBG G31 9.0 fl oz + Aviator 0.5 fl oz	14	-	7.3bc	6.8cd	6.8cd	6.5b-d	5.5e	5.0e	5.3cd
Vital sign 6 fl oz + Concorde 82.5WDG 3.2 oz + Aviator 0.5 fl oz	14	-	7.5a-c	6.3d	7.0c	7.0b	5.0ef	5.0e	5.3cd

^a Turf quality was also assessed on a regular basis using a 0-9 scale where a score of 9 represented excellent turf quality. Any score below 6.0 indicated unacceptable levels of turf quality

^b Treatments followed by the same letter within columns are not statistically different according to Fisher's unprotected LSD, P=0.05.

^c The Signature Program 1 included the following treatments and application dates.

- Chipco Signature (4.0 oz) + Bayleton 50 DF (1.0 oz), May 18
- Chipco Signature (4.0 oz) + Armada (6.0 oz), June 02
- Chipco Signature (4.0 oz) + Chipco 26GT (4.0 fl oz), June 16
- Chipco Signature (4.0 oz) + Armada (6.0 oz), June 30
- Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), July 14

The Signature Program 2 included the following treatments and application dates.

- Chipco Signature (4.0 oz) + Bayleton 50 DF (1.0 oz), May 18
- Chipco Signature (4.0 oz) + Compass 50WDG (0.15 oz) + Chipco 26GT (4.0 fl oz), June 02
- Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), June 16
- Chipco Signature (4.0 oz) + Chipco 26GT (4.0 fl oz), June 30
- Chipco Signature (4.0 oz) + Daconil Ultrex 82.5 WDG (3.2 oz), July 14